**One-Pager Report:** Filter Design Pattern
**Team Members:** Alosada, Manatad, Villarias

I. **Definition**

The Filter Design Pattern, also known as the Criteria Pattern, is a structural design pattern that allows you to filter objects based on certain criteria and compose them in a flexible and reusable manner. It provides a way to select a subset of objects from a collection without exposing the underlying representation of that collection.

II. **History**

The Filter Design Pattern was first introduced by the "Gang of Four" (Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides) in their influential book "Design Patterns: Elements of Reusable Object-Oriented Software," published in 1994.

III. **Usages**
   a. Filtering Data Items
      Example: Displayed items on the website filtered through their respective categories.

   b. Data Analysis
      Example: Research data analysis respondents filtered by their age to check for a common trend.

   c. Search Engines
      Example: Searching in Google filtering out the results by relevance.

   d. Security and Authentication
      Example: Filtered content that users can access based on the access level.

IV. **Implementation**
   a. Create a class on which Criteria is to be applied.
   b. Create an interface for Criteria.
   c. Create concrete classes implementing the Criteria interface.
   d. Use different Criteria and their combination to filter out the objects.

V. **Advantages**
   a. Modularity
   b. Reusability
   c. Maintainability
   d. Flexibility

VI. **Disadvantages**
   a. Complexity
   b. Increased Codebase
   c. Potential for Over-Abstraction

VII. **Sample Code**
   https://github.com/alosadahg/Design-Patterns